

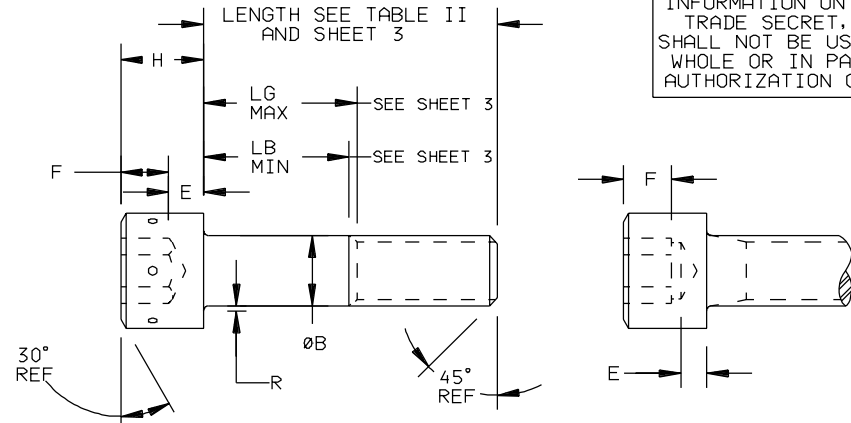
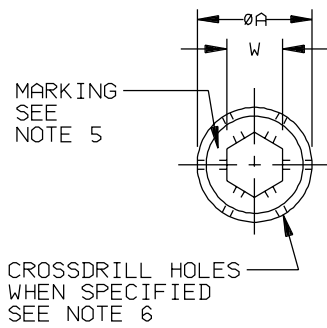


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DRAWING NUMBER
SPS-B-94707

ISSUE DATE
 1/23/97

REVISION
 (10) 3/31/03



OPTIONAL
 MACHINE
 SOCKET AND
 THD TO HEAD
 CONFIGURATION

TABLE I

DASH NUMBER	THREAD SIZE	ØA	ØB	E MIN	F MIN	H	R FILLET EXT	W NOM
90	.060-80 UNRF-3A	.096 .091	.060 .0568	.020	.025	.060 .057	.007 .003	.050
91	.073-64 UNRC-3A .073-72 UNRF-3A	.118 .112	.073 .0695	.025	.031	.073 .070	.007 .003	.062
92	.086-56 UNRC-3A .086-64 UNRF-3A	.140 .134	.086 .0822	.029	.038	.086 .083	.008 .004	.078
93	.099-48 UNRC-3A .099-56 UNRF-3A	.161 .154	.099 .0949	.034	.044	.099 .095	.008 .004	.078
94	.112-40 UNRC-3A .112-48 UNRF-3A	.183 .176	.112 .1075	.038	.051	.112 .108	.009 .005	.094
95	.125-40 UNRC-3A .125-44 UNRF-3A	.205 .198	.125 .1202	.043	.057	.125 .121	.010 .006	.094
96	.138-32 UNRC-3A .138-40 UNRF-3A	.226 .218	.138 .1329	.047	.064	.138 .134	.010 .006	.109
98	.164-32 UNRC-3A .164-36 UNRF-3A	.270 .262	.164 .1585	.056	.077	.164 .159	.012 .007	.141
3	.190-24 UNRC-3A .190-32 UNRF-3A	.312 .303	.190 .184	.065	.090	.190 .185	.014 .009	.156
4	.250-20 UNRC-3A .250-28 UNRF-3A	.375 .365	.250 .2435	.095	.120	.250 .244	.014 .009	.188
5	.312-18 UNRC-3A .312-24 UNRF-3A	.469 .457	.3125 .3053	.119	.151	.312 .306	.017 .012	.250
6	.375-16 UNRC-3A .375-24 UNRF-3A	.562 .550	.375 .3678	.143	.182	.375 .368	.020 .015	.312
7	.437-14 UNRC-3A .437-20 UNRF-3A	.656 .642	.4375 .4294	.166	.213	.438 .430	.023 .018	.375
8	.500-13 UNRC-3A .500-20 UNRF-3A	.750 .735	.500 .4919	.190	.245	.500 .492	.026 .020	.375
9	.562-12 UNRC-3A .562-18 UNRF-3A	.843 .827	.5625 .5538	.214	.265	.562 .554	.028 .022	.437
10	.625-11 UNRC-3A .625-18 UNRF-3A	.938 .921	.625 .6163	.238	.307	.625 .616	.032 .024	.500
12	.750-10 UNRC-3A .750-16 UNRF-3A	1.125 1.107	.750 .7406	.285	.370	.750 .740	.039 .030	.625
14	.875-9 UNRC-3A .875-14 UNRF-3A	1.312 1.293	.875 .8647	.333	.432	.875 .864	.044 .034	.750
16	1.000-8 UNRC-3A 1.000-12 UNRF-3A 1.000-14 UNRS-3A	1.500 1.479	1.000 .9886	.380	.495	1.000 .988	.050 .040	.750
18	1.125-7 UNRC-2A 1.125-12 UNRF-2A	1.688 1.665	1.125 1.1086	.428	.557	1.125 1.111	.055 .045	.875
20	1.250-7 UNRC-2A 1.250-12 UNRF-2A	1.875 1.852	1.250 1.2336	.475	.620	1.250 1.236	.060 .050	.875
22	1.375-6 UNRC-2A 1.375-12 UNRF-2A	2.062 2.038	1.375 1.3568	.523	.682	1.375 1.360	.065 .055	1.000
24	1.500-6 UNRC-2A 1.500-12 UNRF-2A	2.250 2.224	1.500 1.4818	.570	.745	1.500 1.485	.070 .060	1.000
28	1.750-5 UNRC-2A 1.750-12 UNRF-2A	2.625 2.597	1.750 1.7295	.665	.870	1.750 1.734	.080 .070	1.250
32	2.000-4.5 UNRC-2A 2.000-12 UNRF-2A	3.000 2.970	2.000 1.9780	.760	.995	2.000 1.983	.090 .075	1.500
36	2.250-4.5 UNRC-2A 2.250-12 UNRF-2A	3.375 3.344	2.250 2.2280	.855	1.120	2.250 2.232	.100 .085	1.750
40	2.500-4 UNRC-2A 2.500-12 UNRF-2A	3.750 3.717	2.500 2.4762	.950	1.245	2.500 2.481	.110 .095	1.750
44	2.750-4 UNRC-2A 2.750-12 UNRF-2A	4.125 4.090	2.750 2.7262	1.045	1.370	2.750 2.730	.120 .105	2.000
48	3.000-4 UNRC-2A 3.000-12 UNRF-2A	4.500 4.464	3.000 2.9762	1.140	1.495	3.000 2.979	.130 .115	2.250

TOLERANCES ±.010 AND ±2°
 SURFACE ROUGHNESS 125
 UNLESS OTHERWISE NOTED
 DRAFTED IN ACCORDANCE WITH ASME Y14.5M
 DRAWN BY: KATHY SCHWARTZ DATE: 1/23/97
 APPROVED: L KLINE DATE: 4/2/03
 APPROVED: S FOSTER

TITLE
 SCREW, SOCKET HEAD CAP
 HEXAGON RECESS, ALLOY STEEL
 1960 SERIES

STANDARDS AND SPECIFICATIONS
 FF-S-86
 EXCEPT AS NOTED
 PART NUMBER:
 94707() ()-() ()-() ()
 SHEET 1 OF 4



DRAWING NUMBER
SPS-B-94707

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⑩ 3/31/03

TABLE II

SIZE	LENGTH TOLERANCE TABLE			
	UP TO 1" INCL.	OVER 1" TO 2-1/2 INCL.	OVER 2-1/2 TO 6" INCL.	OVER 6"
#0 THRU 3/8"	-0.03	-0.04	-0.06	-0.12
7/16" THRU 3/4"	-0.03	-0.06	-0.08	-0.12
7/8" AND 1-1/2"	-0.05	-0.10	-0.14	-0.20
OVER 1-1/2"	---	-0.18	-0.20	-0.24

TABLE III

TORQUE VALUES LISTED ARE FOR PLAIN SCREWS, FOR CADMIUM PLATED SCREWS, MULTIPLY RECOMMENDED SEATING TORQUE BY .75; FOR ZINC PLATED SCREWS MULTIPLY BY 1.40

SIZE	TENSILE STRENGTH IN POUNDS		RECOMMENDED SEATING TORQUE IN INCH POUNDS		ULTIMATE TENSILE STRENGTH PSI	YIELD STRENGTH PSI MIN.	DOUBLE SHEAR STRENGTH OF BODY LBS. MIN.
	UNRC	UNRF	PLAIN				
			UNRC	UNRF			
#0	----	340	---	2	190,000	170,000	640
#1	500	530	4	4	190,000	170,000	950
#2	700	750	6	7	190,000	170,000	1,320
#3	930	1,000	10	11	190,000	170,000	1,750
#4	1,150	1,260	15	16	190,000	170,000	2,240
#5	1,510	1,580	20	21	190,000	170,000	2,800
#6	1,730	1,930	28	30	190,000	170,000	3,400
#8	2,660	2,800	49	50	190,000	170,000	4,800
#10	3,330	3,800	64	76	190,000	170,000	6,450
1/4	6,050	6,910	150	170	190,000	170,000	11,200
5/16	9,960	11,000	305	325	190,000	170,000	17,500
3/8	14,700	16,700	545	570	190,000	170,000	25,200
7/16	20,200	22,600	840	900	190,000	170,000	34,200
1/2	27,000	30,400	1,300	1,370	190,000	170,000	44,700
9/16	32,800	36,500	1,860	1,970	180,000	155,000	53,700
5/8	40,700	46,100	2,530	2,660	180,000	155,000	66,300
3/4	60,200	67,100	4,400	4,800	180,000	155,000	95,400
7/8	83,100	91,700	7,000	7,600	180,000	155,000	129,800
1	109,000	119,000	10,400	11,000	180,000	155,000	169,600
1(14)	-----	122,000	-----	11,600	180,000	155,000	169,600
1-1/8	137,000	154,000	14,900	16,600	180,000	155,000	214,000
1-1/4	175,000	193,000	21,000	22,600	180,000	155,000	265,000
1-3/8	208,000	237,000	27,800	29,300	180,000	155,000	320,000
1-1/2	253,000	285,000	36,500	39,300	180,000	155,000	381,000
1-3/4	342,000	394,000	59,900	68,900	180,000	155,000	519,000
2	450,000	521,000	89,900	104,000	180,000	155,000	678,000
2-1/4	585,000	664,000	131,000	150,000	180,000	155,000	858,000
2-1/2	720,000	828,000	180,000	207,000	180,000	155,000	1,060,000
2-3/4	888,000	1,006,000	244,000	277,000	180,000	155,000	1,282,000
3	1,074,000	1,204,000	322,000	361,000	180,000	155,000	1,526,000

THE TENSILE STRENGTH IS BASED ON THE STRESS LISTED IN TABLE III AND THE AREA PER ASME B1.1.

THE RECOMMENDED SEATING TORQUES LISTED SERVE AS GUIDELINES ONLY. EVEN WHEN USING THE RECOMMENDED SEATING TORQUES, THE INDUCED LOADS OBTAINED MAY VARY AS MUCH AS ±25% DEPENDING UPON THE UNCONTROLLED VARIABLES SUCH AS MATING MATERIAL, PLATING, LUBRICATION, SURFACE FINISH, HARDNESS, BOLT/Joint COMPLIANCE, METHOD OF TIGHTENING, ETC. HOWEVER, THE BEST WAY TO DETERMINE THE CORRECT TORQUE IS TO RUN TESTS ON THE PARTICULAR JOINT BY TIGHTENING SAMPLE BOLTS UNTIL THEY JUST BEGIN TO YIELD. THE OPTIMUM TORQUE IS 80% OF THIS VALUE.

1. MATERIAL: ALLOY STEEL PER CHEMISTRY OF ASTM A574.
2. HEAT TREATMENT: 38-43 HRC.
3. FINISH: SEE NOTE 6.
4. DIMENSIONS, GEOMETRIC TOLERANCE PER ASME B18.3 - INCLUDING MANUFACTURING NOTES NOT LISTED IN THIS DRAWING.
5. MARK SPS' MANUFACTURER'S IDENTIFICATION, LOCATION OPTIONAL ON TOP OR SIDE OF HEAD.
6. PART NUMBERING: 94707() () - () ()

FINISH = B-CHEMICAL BLACK OXIDE PER MIL-DTL-13924.
 C-CADMIUM PLATE PER AMS-QQ-P-416, TYPE I, CLASS 3.
 D-CADMIUM PLATE PER AMS-QQ-P-416, TYPE II, CLASS 3.
 H-CADMIUM PLATE PER AMS-QQ-P-416, TYPE I, CLASS 2.
 J-CADMIUM PLATE PER AMS-QQ-P-416, TYPE II, CLASS 2.
 (YELLOW CHROMATE)
 M-CADMIUM PLATE PER AMS-QQ-P-416, TYPE II, CLASS 2.
 (OLIVE DRAB)
 S-SILVER PLATE PER AMS2410.
 U-ZINC PLATE PER ASTM B633 TYPE III SCI.
 Z-ZINC PLATE PER ASTM B633 TYPE II SCI.
 NO LETTER-THERMAL OXIDE (BLACK) PLUS RUST PREVENTATIVE OIL.

= LENGTH IN SIXTEENTHS
 THREAD = C-COARSE
 F-FINE
 S-SPECIAL
 = DASH NUMBER (BASIC DIAMETER)
 LOCKING FEATURE = NO LETTER-NO LOCKING FEATURE
 E-TYPE P (PATCH) PER MIL-DTL-18240
 K-TYPE N (PELLET) PER MIL-DTL-18240
 TF-TRU-FLEX
 CROSSDRILL HEADS: H1 = 1 HOLE THRU
 H2 = 2 HOLES THRU
 H3 = 3 HOLES THRU
 DIMENSIONS PER ASME B18.3

BASIC PART NUMBER

7. THREAD SIZES NOT LISTED IN TABLE VA OR VB OF MIL-DTL-18240, ONLY A POSITIVE INDICATION OF TORQUE IS REQUIRED FOR 5 UNSEATED INSTALLATIONS AND REMOVALS.



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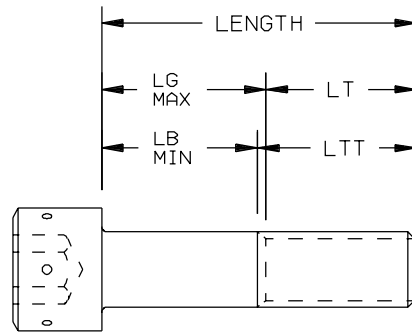


TABLE V

BASIC THREAD DIAMETER	LT THREAD LENGTH MIN	LTT TOTAL THREAD LENGTH MAX
#0	0.50	0.62
#1	0.62	0.77
#2	0.62	0.80
#3	0.62	0.83
#4	0.75	0.99
#5	0.75	1.00
#6	0.75	1.05
#8	0.88	1.19
#10	0.88	1.27
1/4	1.00	1.50
5/16	1.12	1.71
3/8	1.25	1.94
7/16	1.38	2.17
1/2	1.50	2.38
5/8	1.75	2.82
3/4	2.00	3.25
7/8	2.25	3.69
1	2.50	4.12
1-1/8	2.81	4.65
1-1/4	3.12	5.09
1-3/8	3.44	5.65
1-1/2	3.75	6.08
1-3/4	4.38	7.13
2	5.00	8.11
2-1/4	5.62	8.99
2-1/2	6.25	10.00
2-3/4	6.88	10.87
3	7.50	11.75

THE LENGTH OF COMPLETE THREAD "LT" SHALL BE CONTROLLED BY THE GRIP LENGTH "LG" AS DESCRIBED IN NOTE A), AND THE LENGTH OF TOTAL THREAD "LTT" SHALL BE CONTROLLED BY THE BODY LENGTH "LB" AS SET FORTH IN NOTE B). THE "LT" MINIMUM AND "LTT" MAXIMUM VALUES SHOWN IN TABLE V ARE REFERENCE DIMENSIONS INTENDED FOR CALCULATION PURPOSES ONLY IN ACCORDANCE WITH NOTE C). SEE SKETCH ABOVE.

- A) THE GRIP LENGTH "LG" SHALL BE MAXIMUM AND REPRESENTS THE MINIMUM DESIGN GRIP LENGTH OF THE SCREW. IT SHALL BE MEASURED, PARALLEL TO THE AXIS OF SCREW, FROM THE BEARING SURFACE OF THE HEAD TO THE FACE OF A "GO" THREAD RING GAGE, HAVING THE COUNTERSINK AND/OR COUNTERBORE REMOVED, WHICH HAS BEEN ASSEMBLED BY HAND AS FAR AS THE THREAD WILL PERMIT. THE "LG" MAXIMUM LENGTH IS A CRITERION FOR ACCEPTANCE AND SHALL CONFORM TO THE VALUES GIVEN IN TABLE IV OR, FOR DIAMETER/LENGTH COMBINATIONS NOT SHOWN THEREIN, SHALL BE AS CALCULATED PER NOTE C).
- B) THE BODY LENGTH "LB" SHALL BE MINIMUM AND REPRESENTS THE MINIMUM FULL BODY LENGTH OF THE SCREW. IT SHALL BE MEASURED, PARALLEL TO THE AXIS OF THE SCREW, FROM THE BEARING SURFACE OF THE HEAD TO THE TOP OF THE EXTRUSION ANGLE OR TO THE LAST SCRATCH OF THE THREAD. THE "LB" MINIMUM LENGTH IS A CRITERION FOR ACCEPTANCE AND SHALL CONFORM TO THE VALUES GIVEN IN TABLE IV OR, FOR DIAMETER/LENGTH COMBINATIONS NOT SHOWN THEREIN, SHALL BE AS CALCULATED IN ACCORDANCE WITH NOTE C).
- C) FOR SCREWS OF NOMINAL LENGTH NOT LISTED IN TABLE IV AND FOR NOMINAL SIZES LARGER THAN 1 INCH DIAMETER, THE MAXIMUM GRIP LENGTH "LG" AND MINIMUM BODY LENGTH "LB" SHALL BE DETERMINED FROM THE FOLLOWING FORMULAS:
 $LG = LENGTH - LT$
 $LB = LENGTH - LTT$
 WHERE: LENGTH = NOMINAL SCREW LENGTH; LT = MINIMUM THREAD LENGTH FROM TABLE V;
 LTT = MAXIMUM TOTAL THREAD LENGTH FROM TABLE V.
 SCREWS HAVING NOMINAL LENGTH FALLING BETWEEN THOSE FOR WHICH "LG" AND "LB" VALUES ARE TABULATED IN TABLE V SHALL HAVE "LG" AND "LB" DIMENSIONS CONFORMING TO THOSE OF THE NEXT SHORTER TABULATED NOMINAL LENGTH FOR THE RESPECTIVE SCREW SIZE.

TOLERANCES ±.010 AND ±.2
SURFACE ROUGHNESS 125
UNLESS OTHERWISE NOTED

DRAFTED
IN ACCORDANCE
WITH ASME Y14.5M



PART NUMBER:
94707 () () - () () - () ()